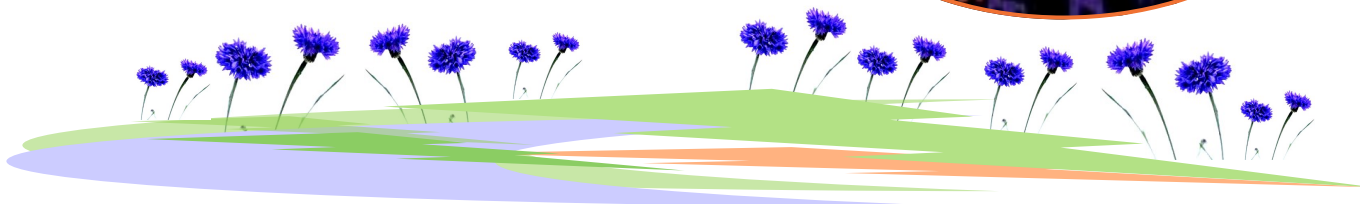


Spring 2014 Peak Performance Newsletter



Performance Branch, NWS Office of Climate, Water, and Weather Services, Silver Spring, MD

This Issue: May 2014

Special Marine Warning Verification Efforts at NWS Newport/Morehead City, NC.....	1
On the Road Again	3
Service Assessment Program: National Service Assessments—One Down, One to Go.....	7
Fly...with Ointment: The FAA-NWS QMS Program	9
Did You Know?.....	11
Status of Service Assessment Actions.....	14
Contact Information	15

Special Marine Warning Verification Efforts at NWS Newport/Morehead City, NC

By David Glenn, NWS Newport/Morehead City,
North Carolina

The National Weather Service office in Newport/Morehead City (MHX), NC, has marine warning responsibility for the coastal waters from Surf City, NC, north to Currituck Beach Light, NC, out to 40 nautical miles, including the Pamlico and Albemarle Sounds. MHX has issued an average of 148 special marine warnings (SMW) per year since storm-based SMWs began in 2007. From 2008 to 2010, our office verified just 3 percent of the SMWs issued, while from 2011 to present we verified nearly 24 percent. The increase in verified warnings can be attributed to a renewed focus to ensure all marine wind and hail data were scrutinized and included in NWS Storm Data reports.

Across the MHX marine area of responsibility, there are several observations available along coastal sections, but much fewer observations exist across

the open ocean and the Pamlico and Albemarle Sounds (**Fig. 1 and Fig. 2**). We are fortunate to have a great working relationship with ©WeatherFlow Inc., which has numerous marine platforms along the North Carolina coast. There are four National Ocean Service tide gages from Duck to Beaufort, NC, with 6-minute meteorological data, and two National Data Buoy Center buoys with 10-minute meteorological data across Diamond Shoals and Onslow Bay, NC. A few bridge tenders across our area have anemometers manned 24-hours a day throughout the year. Unfortunately, the wind data are often not recorded or archived. These locations must be contacted in near real-time to be of value. There are also a handful of Automated Surface Observing System (ASOS) and Automated Weather Observation System (AWOS) sites near the coast that are useful in verifying SMWs.

Continued on next page...

Special Marine Warning Verification Efforts at NWS Newport/Morehead City, NC – Continued from Page 1

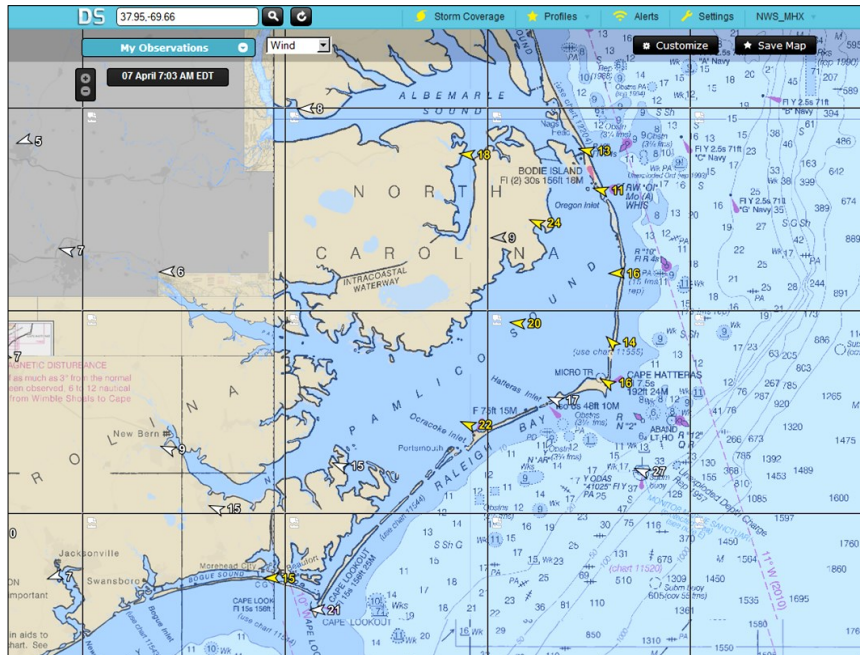


Figure 1: The WeatherFlow DataScope interface, which includes proprietary data sources (yellow), National Ocean Service (white), National Data Buoy Center (along the coast and offshore in white), and ASOS/AWOS stations (white) across Eastern North Carolina coastal waters and sounds. Area bridge tenders are not noted on the map.

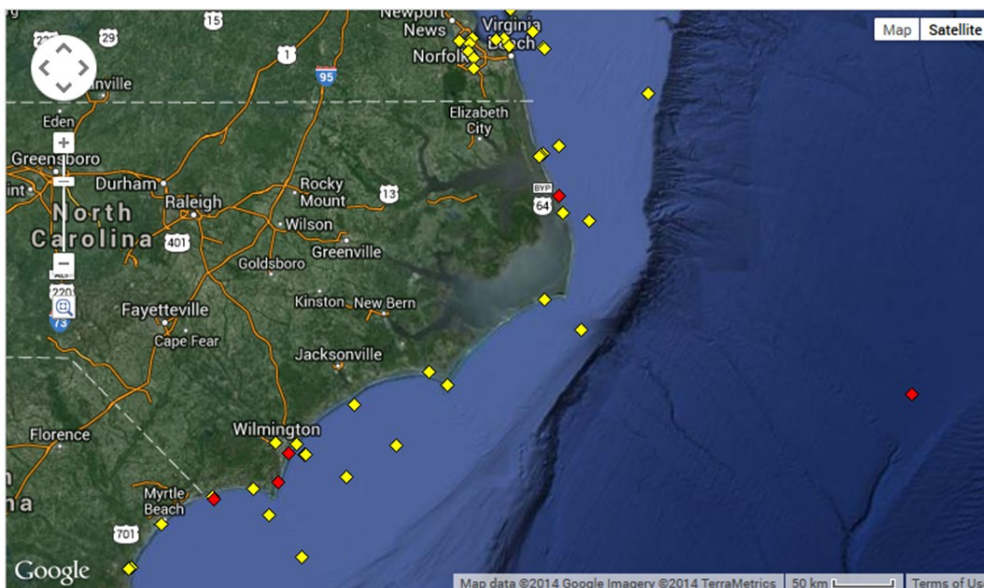


Figure 2: The National Data Buoy Center display of buoys, tide gages, and C-Man stations. Active reporting stations are in yellow. Inactive stations are marked red.

SMW verification often has a lower priority during severe weather operations. While knowing and utilizing your local verification sites is essential, remembering to follow-up with archived data days or weeks after an event is the most important step. Also, do not forget that NWSI 10-1605, *Storm Data Preparation*, permits the use of land-based observations as a verification source as long as the site is located within one mile of the shore-line.

NWSI 10-1601, *Verification*, notes several reasons why it is important to verify NWS forecasts and

warnings, and although the NWS does not have a Government Performance and Results Act goal for SMWs, there are several benefits to verifying these warnings. Verifying SMWs allows the public, our emergency management, and broadcast media partners to assess the veracity of an additional “warning” product. Undoubtedly, there are instances when SMWs are unverifiable simply due to the lack of marine observations. That fact, however, should not discourage any NWS office from actively seeking out data to verify SMWs for Storm Data.◆



By Brent MacAloney, Performance Branch, NWS Headquarters

EF-Scale Rating Open

Feedback Forum – It was a real treat to be part of an activity where everyone came together with the intent of improving the EF-scale rating method.



Believe it or not, it has been almost 2 years since I last traveled for the National Weather Service. This mostly had to do with the Government's budget situation, but also, I was burned out. I had been traveling a lot. It was to the point where I was getting tired of coming home, washing my clothes and then turning around for my next trip. Knowing I was going to become a father in January 2012 and how hard it would be on my family with me continuing at that pace, I welcomed the budget crisis and the travel moratorium with open arms. However, I knew this restriction in travel wouldn't last forever and that I would be called on to head back out "*on the road again.*" Well, that time has come and I've gone on four trips in the last 4 months.

Kansas City

I am fortunate to have been invited to teach part of the WCM/SCH Training Course whenever it is held. As a result of budget issues, it had been quite some time since the last course was held—2010 to be exact—but in December 2013 the class finally resumed. I was excited because I felt like there were a bunch of new WCMs that I had never met. There is just no better way to build trust with the people you work with than participating in a face-to-face meeting.

The highlight of this trip and training session had to be speaking about the OMB approved survey questions, which are available on the Performance Management website at: <http://goo.gl/dcQz5P>.

The majority of the content I talked about was covered in my Fall 2013 Peak Performance Newsletter article at: <http://goo.gl/U7pE2Z>, so I will not rehash it here. However, I did inform the WCMs that they are now able to ask very specific questions about the public perception of our products and services in a meaningful and legal way. Many of the WCMs and SCHs in the class were unaware these surveys even existed and were excited to be able to use them with upcoming events.

While I was out in Kansas City, I was able to sit down with management at Central Region Headquarters and brief them on what we are doing in the Performance Branch, where the program is headed, and listen to their concerns and needs. Back when I traveled regularly, I would usually visit each regional headquarters every other year for such briefings. It was good to sit down with the staff and have this type of face-to-face discussion once again. It was a very productive meeting and I was glad I could chisel out some time in my schedule to do this.

Atlanta

This year's American Meteorological Society Annual Meeting was held from February 2 – 6, 2014 in Atlanta, GA. This was my triumphant return to AMS, having been absent for the last 2 years. It did not take me long to remember how crazy AMS meetings really are. If you have

Continued on next page...

Page 3

On the Road Again – Continued from Page 3

never been, it is a wall-to-wall week of meetings, presentations, outreach and discussions with partners and colleagues. The highlights of my week at AMS were as follows:

WeatherFest – For many years, I served on the WeatherFest committee in which I organized and led the volunteers at the event. Having handed-off that responsibility a couple years ago, this year I was able to just enjoy WeatherFest as a volunteer.

EF-Scale Rating Open Feedback Forum – Jim LaDue from the Warning Decision Training Branch (WDTB) and I led an open forum in which AMS attendees could voice their opinion on the state of the current EF-scale rating method and make recommendations on how to improve it. To my amazement, the room was filled to capacity and we even had about 30 individuals participating remotely. It was a real treat to be part of an activity where everyone came together with the intent of improving the EF-scale rating method. If you wish to watch the presentations and hear the discussion from the EF-scale meeting, please go to the EF-Scale Open Feedback Forum webpage located at: <http://apps.weather.gov/efscale/>.

July 1st 2012 Derecho: Decision Support for a High Impact, Low Confidence Event Presentation – Although my packed schedule prohibited me from attending as many presentation sessions as I would have liked to attend, one of the presentations really peaked my interest. It was a presentation from Lara Pagano and Tom Lonka on the Decision Support Services that the Morehead City, NC (MHX) office gave on the July 1, 2012 derecho event in their county warning area. In the Performance Branch we are always

encouraging offices to conduct local assessments of their performance and service after a high impact event. How else will we become better at what we do unless we do some self-reflecting on a recent event? Well, this is exactly what the MHX office did, writing a report, as well as outlining the assessments process and findings in their briefing.

Oklahoma City

The week after AMS, I did a quick turn around and headed out to Oklahoma City, OK for the National Tornado Summit (NTS), which ran from February 10-11, 2014. For those who were familiar with the National Severe Weather Workshop that took place every spring, it sort of morphed into this event, drawing an audience that mostly consists of emergency managers, first responders, meteorologists, and those working in the insurance industry.

At this event, Jim LaDue (**Figure 1**) and I once again joined forces to run a session on the current state of the EF-Scale. We were also scouting for any attendees who may be



Figure 1: Jim LaDue (L) discusses the current state of the EF-Scale while Brent MacAloney (R) looks on. Photo source: National Tornado Summit Facebook Page– (<http://goo.gl/MGXoAJ>)

On the Road Again – Continued from Page 4

interested in joining the EF-Scale Steering Committee. The format of this meeting was similar to the Open Forum held at the AMS meeting, but shorter and targeted toward a completely different audience. The presentation was well received and we had several folks approach us at the end so we could keep in contact with them about where the NWS was going with the EF-Scale Rating Policy.

While at the NTS, there were two presentations that really struck me as interesting.

The NWS Next Generation Warning Concepts

FACETS – This presentation was given by Lans Rothfusz (**Figure 2**) from the National Severe Storms Laboratory. Users were treated with some examples of how the warning operations could be changed in the future to help the public better understand the severe weather threat at their location.

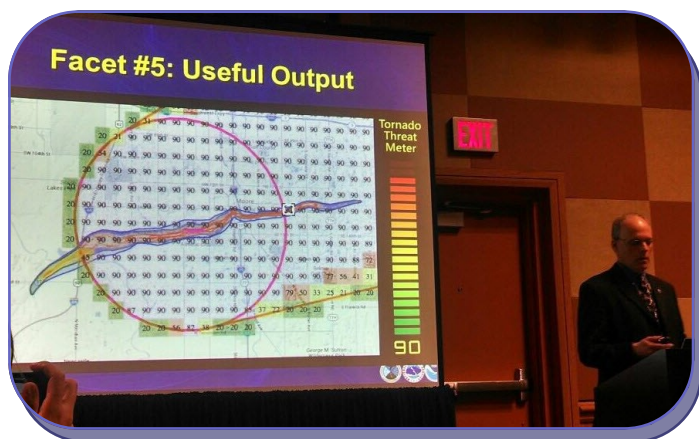


Figure 2: The NWS Next Generation Warning Concepts FACETS presentation given by Lans Rothfusz from the National Severe Storms Laboratory.

A similar presentation was given by Lans at AMS that was recorded and is available to view here:

<http://goo.gl/RzrICz>.

I highly suggest everyone take a look at this, as I personally believe something like this is the future of warning forecast operations.

The Science of Disaster Resiliency – This presentation was given by Dr. Tanja Brown from the Insurance Institute for Business & Home Safety (IBHS). This was a very interesting presentation that gave us a glimpse as to what goes on at the IBHS Research Center in Richburg, SC. From the test chamber that researchers put structures into and blast with extreme winds, to their windblown hail simulator that is used for impact testing on various roofing materials, I walked away with a new found respect for the multi-risk research taking place at the IBHS. It was a great presentation.

Charleston

Last, but not least, there was a meeting in Charleston, SC on Wednesday, March 12, 2014 of NOAA's Disaster Loss Working Group, of which Ron Morales (WCM Charleston, SC) and I are members. This group is working on a response to the 50 recommendations made by Booz Allen Hamilton (BAH) in their report on "Economic Impacts of Weather- and Climate-Related Disasters," published on March 29, 2013. The BAH report outlines how NOAA's NWS WFOs, National Hurricane Center, National Climatic Data Center, and Fisheries are estimating weather and climate damage losses, and makes recommendations on ways to make these damage loss estimates more accurate. Ron and I are on this working group as any decisions made by NOAA with regard to damage loss estimates will most definitely have an impact on those who capture information and log it in storm data.

I will say, after all the travel I was on for the last few months, this last meeting Charleston was probably the most fulfilling, since I really believe we are on the cusp of doing some

On the Road Again – Continued from Page 5

great things with NOAA's damage estimates. Walking away from this meeting, I would say we are looking at the following time line for how we enter damage estimates in storm data:

Now – 2 years out – Status quo. Continue to do what you are doing to the best of your ability. If you have estimates that are given to you or published in the media, enter them into storm data. If you know of a quick (and I mean really quick) way of estimating or getting an estimate, try to obtain it and enter it into storm data. This makes our storm data product much better. If you can't find an estimate or have no idea what the estimate would be, use the "No information available" check box in storm data as that is still an acceptable way of reporting. No one from a NWS HQ or NOAA level wants anyone to be stressed out or wants to see anyone spending a lot of time on estimating damages. However, it should be known that this information is being widely used. So in the best interest of the weather community, and since we are the source of the data, if you can make an educated guess or easily get the damage estimates, please continue to do so.

2 or 3 years out to 10 years out – Deployment and use of a damage estimate calculator. One of the recommendations is to implement a damage estimate calculator into storm data. I do not see this as the be-all and end-all solution to the issue, but it would help create more useful and meaningful estimates and would work as follows. We would likely survey all of you for the 50 or so most common types of damage reports you receive. This would include things like: luxury car destroyed, roof removed from home, large tree down, bridge washed out, cattle killed, etc.

We would put these reports into a database and get economists to estimate how much it would cost to replace or repair each of the damage reports based on current dollar figures. Once this is implemented, you would go into the program and fill in a box next to "Horses" saying there were 12 killed and the program would automatically populate the damage column in storm data with a value. You would do the same thing for all the other damage reports. The economists would then review the costs in the database and adjust them based on annual inflation and increases/decreases to replace/repair the various items.

10+ years out – Communal weather impacts database. Another one of the recommendations is to implement a communal weather impacts database in which the NWS would only be responsible for entering weather-related parameters associated with high impact, severe or unusual weather events. Partners like the Centers for Disease Control and Prevention and the American Red Cross would then enter death and injury information related to these weather events into the database. Partners like insurance companies, USDA/FSA and FEMA would enter in damage estimates associated with these weather events. As you can imagine, this is a huge undertaking that would require higher levels of management setting up a whole host of agreement documents across the weather enterprise. So, that is why this would take so long to implement, but this is our ultimate goal.



Service Assessment Program

By Sal Romano, Performance Branch, NWS Headquarters

National Service Assessments—One Down, One to Go

The May 2013 Oklahoma Tornadoes and Flash Flooding Service Assessment report has been signed by the National Weather Service (NWS) Director while the NOAA–NWS Operations and Services for Flooding in Colorado from September 11–17, 2013 Service Assessment report is going through the final stages of the review process.

Oklahoma Tornado and Flash Flooding Assessment

From May 19–31, 2013, a series of devastating weather events affected the area in and around Oklahoma City. Although the service assessment focuses on three specific days: May 19, 20, and 31, the entire period was characterized by an active weather pattern and multiple tornadoes across several NWS Weather Forecast Office (WFO) areas of responsibility. The historic flash flooding that occurred in Oklahoma City on May 31 is also of note. This flash flooding caused more fatalities on May 31 than the tornadoes on that day.

After the events on May 20 and May 31, NWS Southern Region Regional Operations Center conducted an After–Action Review (AAR). AAR is a professional discussion of the event, focused on performance standards, that enables people to discover for themselves what happened, why it happened, and how to sustain strengths and improve on weaknesses. The AAR provides

offices and the regional headquarters a means to debrief events and quickly share that information with other field/regional offices. Early information collected during the AAR process may be used by NWS senior leadership in determining whether or not to initiate a regional or national service assessment. Several of the Oklahoma Tornado and Flash Flooding AAR findings have been incorporated into the service assessment report. The NWS did follow-up after the AAR and formed a Service Assessment Team to evaluate NWS performance and to undertake a detailed social science review to examine the effectiveness of messaging and the behavior of the public in each severe weather event. The team concentrated its efforts primarily on counties and cities affected by the strongest tornadoes during this period. The NWS also conducted a complete review of the WFO Norman and Storm Prediction Center operations.

Colorado Flooding Assessment

The event began on September 9 as a large, slow-moving upper-level circulation that became nearly stationary over the Great Basin of the southwest United States. The broad flow around this system pulled plumes of tropical

[Continued on next page...](#)

Page 7

Service Assessment Program – Continued from Page 7

moisture northward from the Pacific Ocean off the western coast of Mexico and the western Gulf of Mexico. A frontal system became stationary along the Front Range of the Rockies while upslope easterly flow became established. Three episodes of torrential rainfall struck the Front Range from Fort Collins southward to Colorado Springs and east to Denver and Aurora, CO. The most intense events occurred on the nights of September 11–12, and September 15. Rainfall totals far exceeded existing records. In Boulder, 24-hour amounts exceeded 9 inches by the morning of September 12, nearly doubling the previous record. Event rainfall totals exceeded 17 inches in the climatologically favored upslope areas of the Front Range with a large area in eastern Colorado measuring 8–17 inches of precipitation.

Eight people lost their lives as a direct result of

the flooding. Most of these fatalities occurred during the height of flash floods on the evenings of September 11 and 12. Local authorities evacuated more than 18,000 people. There were approximately 19,000 homes and commercial buildings damaged with more than 1,500 destroyed. Authorities estimate the flooding damaged or destroyed almost 485 miles of roads and 50 bridges in the impacted counties.

The NOAA–NWS Operations and Services for Flooding in Colorado from September 11–17, 2013 Service Assessment Team completed on-site visits and telephone interviews. The team leaders presented the team's findings to NWS senior leadership on March 11, 2014. The service assessment team's report is now undergoing review and edit at various offices within NWS Headquarters and is on-track for public release before the end of the month. ♦

On the Road Again – Continued from Page 6

Beyond this, I don't have too many more details on where we are going. The next step is to send the working group's recommendations on to the NOAA CFO in response to the document. From there we hope to get the resources needed to implement some of the recommendations.

As you can tell, the last few months have been a whirlwind for me, but I am thankful to have been considered a good fit for representing the NWS in these forums. Whether it is the way that damage estimates are logged in storm data or the way the EF-Scale is used across the Weather Enterprise, we are on the verge of really making our data much more consistent and usable for generations to come. That is an effort that I am honored to take part in.

Now that all this travel for work is done, I've had a chance to relax with my family on our spring vacation to Key Largo, FL—a trip that was a true pleasure to take. As always, I hope your travels, whether they are personal or business related, will be safe and fun. Until next time, cheers! ♦

*On the road again.
Just can't wait
to get back
on the road again.*

– Willie Nelson





Fly...with Ointment

By Beth McNulty, Performance Branch, NWS Headquarters

The FAA–NWS QMS Program

The impetus for developing a quality management system (QMS) for aviation weather services came from a 2007 International Civil Aviation Organization (ICAO) review of FAA operations. The review recommended FAA develop and implement a QMS using the International Standard Organization (ISO) 9000 standard as a guide.

Since two agencies combine to provide aviation weather to the flying community it was logical to develop a QMS using interagency cooperation. FAA is the meteorological authority for the US, and NWS provides meteorological forecasts that meet FAA requirements. The QMS developed by FAA and NWS is based on existing management controls, with an emphasis on quality. As such, the FAA–NWS QMS program is a management system, NOT a production system, and its scope is all aviation weather. The QMS provides a way for FAA to oversee and evaluate the quality of weather services NWS provides for aviation users.

Phase I (2008–2010)

FAA and NWS representatives worked together over two years to develop the QMS management structure and documentation. Part of the documentation included a system for version control and a manual describing how QMS would be applied to aviation weather, and the selection of the first weather product (TAF in this case) to move under QMS. The initial phase was implemented during 2010, and continued to 2012.

Phase II (2011–2013)

There was some overlap between Phase I and Phase II as the management structure of QMS expanded to cover more aspects of aviation weather. The eventual goal, which was met in late 2013, was to bring the AWC, Hawaii MWO, AAWU, CWSUs, and VAACs into the QMS umbrella with the TAFs.

AWC chose to seek ISO 9001 certification independent of the overall FAA–NWS QMS program. As a result, AWC achieved certification in the fall of 2012, and had its first review during 2013. Even though AWC has an independent QMS, it provides input to the FAA–NWS QMS program.

A different tact was taken to bring CWSUs, VAACs, and the other MWOs into the QMS fold. These organizational units adopted an SOP template and QMS was limited to the operational production of aviation products. This contrasts with applying QMS to the total organization—management, budget and resources, training, and operational production—that AWC did. The operational products for these units under QMS were initially selected for their impact on operations if the quality became subpar. Two functions were looked at: meteorological verification and decision support.

Also during Phase II, the QMS program began holding the initial management reviews and refining the QMS processes. The process

Fly,,, with Ointment – Continued from page 9

involved the selection of areas or products to monitor, development of process improvements, and development of SOPs to apply QMS to operations.

Baseline (2013)

By 2013, the overall concept of the FAA–NWS QMS program had become stable enough to establish a baseline for the program and meteorological performance. The essence of QMS can be summarized as a sequence of Plan, Do, Measure, Adjust; Rinse and repeat indefinitely. This cycle allows the QMS program to continually improve by trying ideas, evaluating what works and what doesn't, and adopting the workable solutions into the management process.

The continual review and recurring reports to management allowed baselining of meteorological verification methods and statistics. Statistical trends in forecast performance are used to identify areas for improvement. These improvements may include forecast technique, changes to verification methods, or a combination of these. Once a revision to the verification method is approved, it is implemented. Performance is then measured to ensure the revised method is effective.

Another baselined element is the overall aviation weather mission. If there are changes to the mission, such as increased emphasis on decision support over simply forecasting weather, those changes may affect the FAA–NWS QMS program. A baseline allows the manager to measure what impact mission changes have on QMS continuity. A key question is, "At what point do mission changes create non-conformity in QMS?" Until such non-conformity is resolved, the QMS plan must develop improvement and modification cycles to mitigate the non-conformity. (In self-evaluation language: non-conformity is a "finding.")

The FAA–NWS QMS program originated during two development and implementation stages. The baseline for QMS creates a point of reference for future improvements.

One thing the development of QMS has accomplished, above all else, has been a consistent interagency interaction on weather products and aviation weather services quality. The interaction has created a QMS that reviews and manages aviation weather services quality and improvements, with a mechanism for detecting problems either in management or forecasting. ♦

Spring 2014 Peak Performance Newsletter Quote

*"Measurement is the first step that leads to control
and eventually to improvement.*

If you can't measure something, you can't understand it.

If you can't understand it, you can't control it.

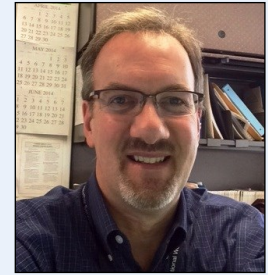
If you can't control it, you can't improve it."

- H. James Harrington

Did You KNOW?

By Doug Young, Performance Branch,
NWS Headquarters

"Did You Know" is a new column dedicated to making you aware of performance and evaluation-related information that you may not have known existed. This could be information within the pages of our website, techniques we are using to verify forecasts and warnings, performance trends, new research papers, training, customer feedback results, or a host of other topics of interest. We hope you find this column interesting and informative and, as always, we welcome your feedback!



Service Assessment Team/Report Status

Did You Know that the Performance Management website contains regularly updated information on the status of active service assessment teams, as well as information about previously launched service assessment teams?

To locate this information, start from the Performance Management homepage and select "Evaluation" and "Service Assessments" from the left menu as shown below (Figure 1).

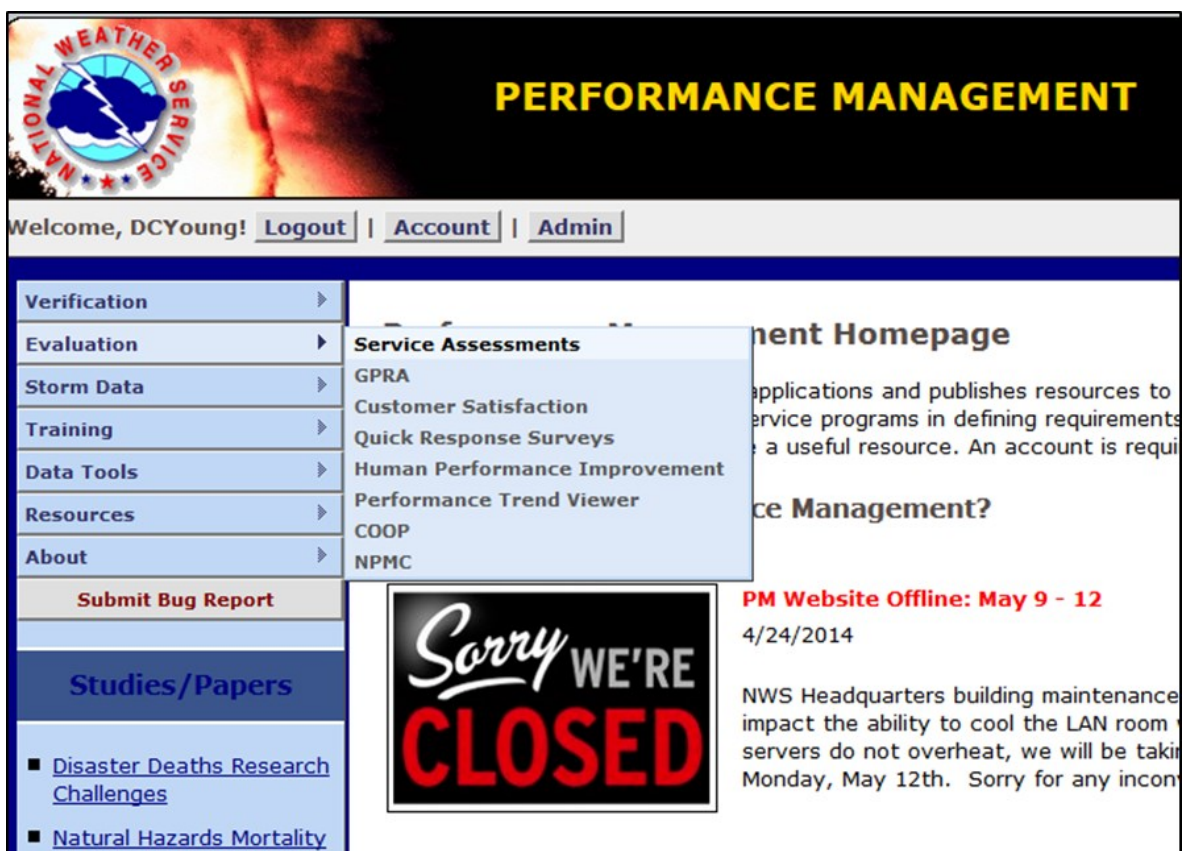


Figure 1. Selecting the "Service Assessments" page from the Performance Management home page.

Did You Know? – Continued from page 11

You will now be on the Service Assessments page (Figure 2). From this point, select “Active and Previous Service Assessments,” which will provide a list of all the active and previous service assessments since we developed the Service Assessments Tracking Software (SATS) in 2008.



Figure 2. Active and Previous Service Assessments web page displaying all active service assessment teams and previous service assessments.

Choose any assessment to obtain information on the background, team membership, a map of the general assessment area, and the latest status of that assessment. Whether you select an active or previous service assessment team, the latest status is listed near the bottom of the page and will display one of the following nine messages:

1. Created Service Assessment
2. Charter signed/Team charged
3. Team deployed on
4. Team returned and drafting report
5. Performance Branch review and editing of report
6. Briefing to Senior Leadership
7. Final editing and review of report
8. Report signed-off by NWS Director
9. Public release of report

Did You Know? – Continued from Page 12

For your convenience, you may also link to the signed team charter and, if completed, the signed report. **Figure 3** is an example of the entire Service Assessment Page from Hurricane and Post-Tropical Cyclone Sandy.

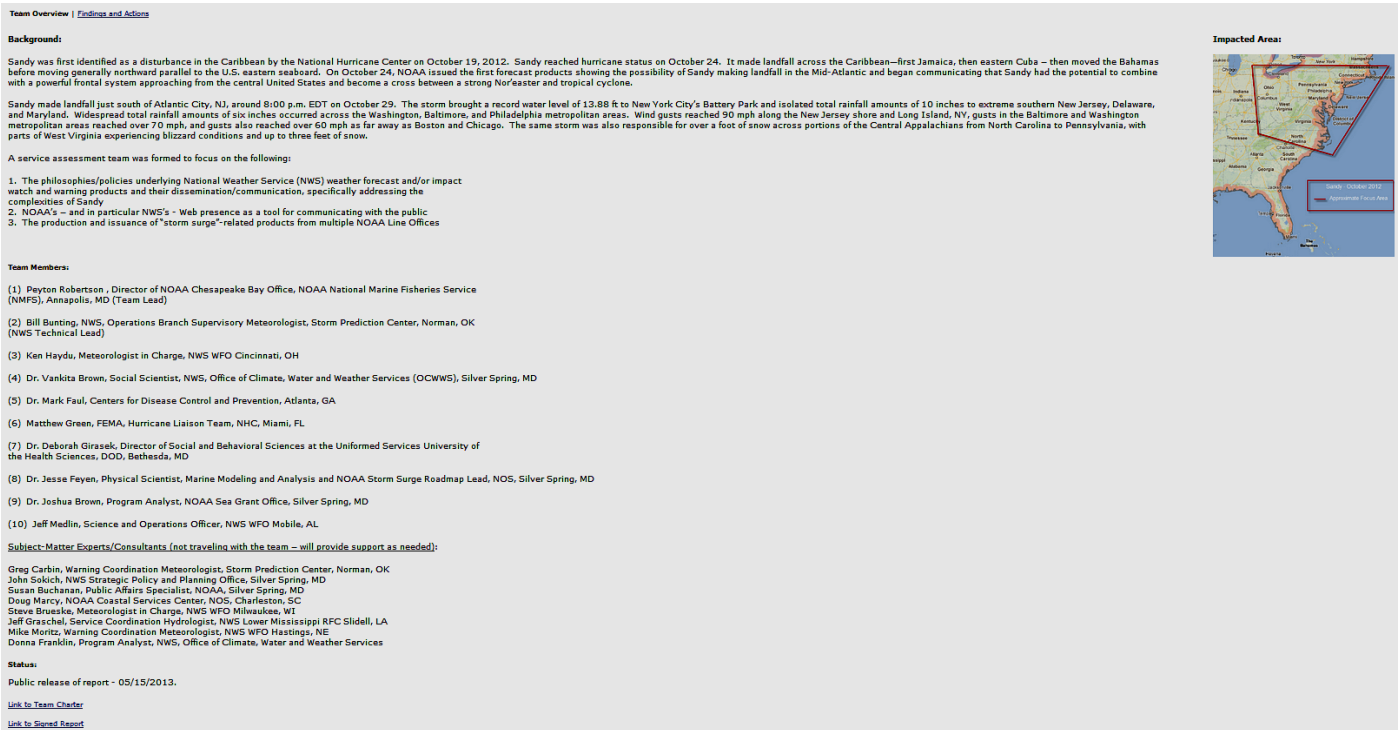


Figure 3. Service Assessment Page for Hurricane and Post-Tropical Cyclone Sandy

For any service assessment-related questions, information, or report copies,
please email either

Sal Romano (Salvatore.romano@noaa.gov)

or

Freda Walters (Alfreda.walters@noaa.gov). ♦

Status of Service Assessment Actions

Summary – May 2014

- Currently, there are 429 total actions from Open Events.
- 113 actions remain open.
- 316 actions are closed.
- More actions expected, with the completion of the most recent Service Assessment: Colorado Flooding of September 11 – 17, 2013

Open Service Assessments

- **May 2013 Oklahoma Tornadoes and Flash Flooding**
Released March 21, 2014
29 Total Actions, 2 (7%) Closed Actions
27 (93%) Open Actions
- **Hurricane and Post-Tropical Cyclone Sandy**
Released May 5, 2013
25 Total Actions, 10 (40%) Closed Actions
15 (60%) Open Actions
- **Remnants of Tropical Storm Lee and the Susquehanna River Basin Flooding of September 6-10, 2011 (Regional Service Assessment)**
Released July 26, 2012
11 Total Actions, 7 (64%) Closed Actions
4 (36%) Open Actions
- **Historic Derecho of June 29, 2012**
Released February 05, 2013
14 Total Actions, 4 (29%) Closed Actions
10 (71%) Open Actions
- **The Missouri/Souris River Floods of May – August 2011 (Regional Service Assessment)**
Released June 05, 2012
29 Total Actions, 21 (72%) Closed Actions
8 (28%) Open Actions
- **May 22, 2011 Joplin Tornado (Regional Service Assessment)**
Released September 20, 2011
16 Total Actions, 12 (75%) Closed Actions
4 (25%) Open Actions
- **Hurricane Irene in August 2011 -**
Released October 05, 2012
94 Total Actions, 66 (70%) Closed Actions
28 (30%) Open Actions
- **Spring 2011 Mississippi River Floods**
Released April 11, 2012
31 Total Actions, 21 (68%) Closed Actions
10 (32%) Open Actions
- **The Historic Tornado Outbreaks of April 2011**
Released December 19, 2011
32 Total Actions, 29 (91%) Closed Actions
3 (9%) Open Actions
- **Record Floods of Greater Nashville: Including Flooding in Middle Tennessee and Western Kentucky, May 1-4, 2010**
Released January 12, 2011
17 Total Actions, 16 (94%) Closed Actions
1(6%) Open Action
- **South Pacific Basin Tsunami of September 29-30, 2009**
Released June 04, 2010
131 Total Actions, 128 (98%) Closed Actions
3 (2%) Open Action

Closed Events (all actions completed)

- **Washington, D.C. High-Impact, Convective Winter Weather Event of January 26, 2011**
Released April 01, 2011
6 Total Actions, - Closed
- **Southeast US Flooding of September 18-23, 2009**
Released May 28, 2010
29 Total Actions - Closed
- **Mount Redoubt Eruptions of March - April 2009 -**
Released March 23, 2010
17 Total Action - Closed
- **Central US Flooding of June 2008**
Released February 03, 2010
34 Total Actions - Closed
- **Mother's Day Weekend Tornadoes of May 10, 2008**
Released November 06, 2009
17 Total Actions - Closed
- **Super Tuesday Tornado Outbreak of February 5-6, 2008**
Released March 02, 2009
17 Total Actions - Closed ♦

Contributors to this Spring 2014 Issue include . . .

David Glenn

Meteorologist
NWS Newport/Morehead City, NC
David.Glenn@noaa.gov

Sal Romano

Performance Branch
NWS Headquarters
Service Assessment and Evaluation
Salvatore.Romano@noaa.gov

Brent MacAloney

Performance Branch, NWS Headquarters
Warning Verification
Brent.Macaloney@noaa.gov

Freda Walters

Co-Editor and Designer
Performance Branch, NWS Headquarters
Service Assessment and Evaluation
Alfreda.Walters@noaa.gov

Beth McNulty

Performance Branch, NWS Headquarters
Aviation Performance and Verification
Beth.Mcnulty@noaa.gov

Doug Young

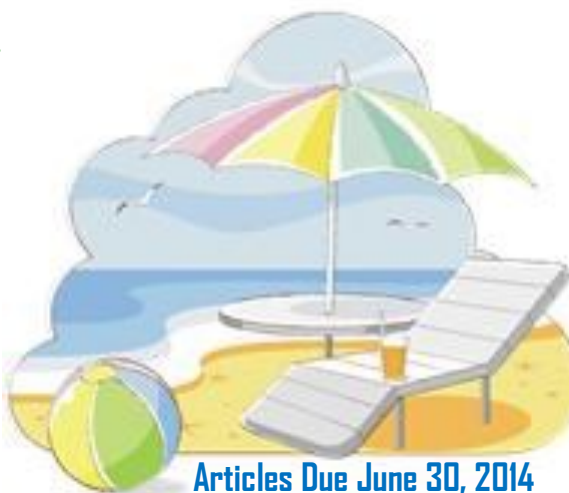
Editor
Performance Branch Chief, NWS Headquarters
Douglas.Young@noaa.gov

Web Links

Stats on Demand:
<https://verification.nws.noaa.gov>
Real-Time Forecast System:
<http://rtvs.noaa.gov/>

*Questions and comments
on this publication should
be directed to Freda Walters.*

**Please consider
contributing
to our next
issue of
Peak
Performance:
Summer 2014**



Articles Due June 30, 2014